RECENT LITERATURE.

Dwight's 'Sequence of Plumages and Moults of the Passerine Birds of New York'.[1]— The present paper is in all respects the most important contribution to the study of plumages and moults that has yet appeared, and is in fact a monograph of the subject it treats, which will serve as a standard work of reference for a long time to come. The treatise comprises 287 pages of text and seven half-tone plates of photographs and photomicrographs of feathers illustrating various methods of abrasion, etc.

The subject of the work is treated under several subheadings, 'Indoor Study of Moult,' 'Process of Moult,' 'Early Plumages and Moults of Young Birds,' 'Sequence of Plumages and Moults,' 'Color Facts *versus* Color Theories,' 'Outdoor Study of Moult,' 'Plumages and Moults of New York Species' (188 pp.), 'Bibliography' (27 pp.).

Under the first of these are considered the fundamental principles of moulting, wear, or feather disintegration, and the determination of age by osteological characters. The last is a most important matter which has never before been clearly set forth, but with Dr. Dwight's explanation all collectors should in future be able to distinguish at once between the 'bird of the year' and the adult in every late summer or autumn specimen, and thus add immensely to the value of their materials. The principal point in Dr. Dwight's explanation will bear repetition: "It is simply this,— the prominent frontal bones of the young bird are thin and transparent showing the brain beneath, while those of the adult are thicker and flecked with whitish dots, which show even better as black dots, when, with the brain removed, the skull is held up to the light." The value of the primary coverts as an index of age is also frequently dwelt upon, as they retain the characters of immature plumage longer than any other feathers.

Under 'Process of Moult' the various feather tracts of the bird are considered with great detail and it is demonstrated that there is much more symmetry in the moult on the body than had previously been supposed. The apparent irregularity is due to the fact that the moult begins almost simultaneously in a number of different tracts, spreading independently in each of them from a central point or focus. Dr. Dwight aptly likens the progress of this moult to a rising tide gradually spreading over a number of small islands. The length of time required for the complete postnuptial moult is also discussed, a question that has occasioned considerable difference of opinion. Dr. Dwight estimates it at about one month to six weeks, as a rule. Under 'Sequence of Plumages and Moults' is a most careful discussion of this whole subject, resulting

[1] The Sequence of Plumages and Moults of the Passerine Birds of New York. By Jonathan Dwight, Jr. Reprinted from the Annals New York Acad. Sci., Vol. XIII, pp. 73–360, pl. i–vii, Oct. 31, 1900.

in a tabulated series of terms, which are adopted in the succeeding pages and which should be followed by all future investigators, both for the sake of uniformity and because the terms seem to be the best that can be suggested. This scheme is as follows:

Plumages.	*Moults.*
1. Natal [= Down].	Postnatal.
2. Juvenal [= "First Plumage."]	Postjuvenal.
3. First Winter.	First Prenuptial.
4. First Nuptial.	First Postnuptial.
5. Second or Adult Winter.	Second or Adult Prenuptial.
6. Second or Adult Nuptial.	Second or Adult Postnuptial.
etc.	etc.

In the chapter on 'Color Facts *versus* Color Theories,' the advocates of 'Aptosochromatism' are considered, and if they have hitherto deceived themselves by thinking that they had still a leg to stand upon, surely it has been knocked from under them by the present paper! Dr. Dwight very aptly concludes this discussion as follows: "Years ago a theory was current that swallows hibernated beneath the mud of ponds. The fact that they could not do it and did not do it is a lesson that our modern color-change theorists would do well to take to heart."

Under 'Out-door Study of Moult' we find much of interest and many important suggestions. The connection between moult and migration is considered as well as the difference between the postjuvenal moult of birds of the first and second brood of a single pair. It is ingeniously suggested in this connection that the first brood, being stronger and more precocious than the second, probably often assume a more advanced first winter plumage than their younger brothers, anticipating in part perhaps the normal plumage of the succeeding nuptial season, which would account for many apparent anomalies.

In considering the preponderance of young in autumn Dr. Dwight advances the plausible suggestion that "the old birds take better care of themselves and the young most frequently fall victims to our powder and shot. Anyone who has chased a family of Towhees along a hedge row will be prepared to admit that it is the parents who skip along at the head of the procession .... and in the autumn do we not find adult Wood Pewees and Scarlet Tanagers almost inaccessible at the very tops of the tallest trees?" This he regards as the *main* cause of the scarcity of fall adult specimens rather than earlier migration and other elements that are operative to a certain extent.

Prefixed to the main chapter of the work is a classification of New York Passerine birds according to the moult. From this we learn that 52 species moult twice a year while 81 have but a single moult. Of the first class, however, 21 moult only to a very limited extent in spring, and

in 14 others the spring moult is largely suppressed after the first year. The only species which have a complete moult twice a year are the Bobolink, Long and Short-billed Marsh Wrens and Sharp-tailed Sparrow,[1] the last being for the first time added to this category by Dr. Dwight.

In the body of the paper the species are considered systematically, following the nomenclature of the Second Edition of the A. O. U. Check-List. From one to three pages are devoted to each species, the plumages being described in numbered paragraphs, beginning with the natal down. The juvenal and one or more of the succeeding plumages are described in detail and the others contrasted with them, while the part played by each moult or by wear in producing the various plumages is carefully considered. The color of the natal down in many birds is here given for the first time, as also descriptions of many juvenal plumages. The only species in which Dr. Dwight was unable to examine specimens in juvenal plumage are *Alauda arvensis*, *Carduelis carduelis*, *Ammodramus nelsoni*, *Passerella iliaca*, *Dendroica palmarum*, and *Geothlypis agilis*.

In his preliminary remarks Dr. Dwight says : "There may be little that is quite new in these pages, for many have traversed the subject before me, but no one has taken just my point of view, and my work has been on absolutely independent lines. Nothing whatever has been taken at second hand." While all this is of course true, nevertheless Dr. Dwight has elaborated the subject to such an extent, and made his work so nearly complete in all but a few species, that it is to be regretted that a slightly different treatment was not adopted, *i. e.*, that more frequent reference was not made through the body of the text to the work of others, so that the large number of new facts set forth by Dr. Dwight should be properly emphasized and the mistakes and erroneous suppositions of others specifically pointed out, when they are corrected. Some apparently authentic "second hand information" might also have been included with advantage where it supplements or differs from the author's experience. This is the only criticism that can well be advanced against this admirable piece of work.

In order to point out more clearly the many new facts first brought forward by Dr. Dwight, the writer will take the liberty of making a comparison with a paper of his own[2] covering much the same ground, and

[1] As illustrating the importance of having specimens taken just at the right time, which Dr. Dwight emphasizes, I may state that when preparing my paper (see below) I examined a series of 104 of these birds and found that while they moulted the tail and body feathers in spring the primaries were apparently retained. Specimen number 105, however, secured after my paper was published, showed the complete moult!

[2] The Molting of Birds with Special Reference to the Plumages of the Smaller Land Birds of Eastern North America. Proc. Acad. Nat. Sci. Phila., 1896 (Apr. 14), pp. 108–165.

which seems to be the only other general paper on the subject. It should be borne in mind that in this paper, owing to lack of space, no attempt was made to describe all the plumages of the species studied, a knowledge of the ordinary ones being taken for granted. Furthermore, the first and second winter and first and second nuptial plumages were not regarded as different plumages unless *easily distinguishable*. In fact, "plumage" indicated, as it frequently does, one of the several *recognizable* dresses that a bird assumes; while Dr. Dwight uses the term in a more exact sense to indicate *every* dress that the bird assumes through its life, and carries his descriptions of the several plumages on as long as any difference whatever can be detected.

Making allowance for this it is interesting, especially to 'aptosochromatomaniacs,' to learn that out of 112 species treated in both papers, studied independently and mainly from different material, we reached, in 71 cases, exactly the same conclusions as to moults and plumages. In 11 other species neither had sufficient material to reach definite conclusions, and in 30 cases Dr. Dwight has been able to prove that a partial spring moult occurred or did not occur when the insufficient material at my command led me to think otherwise. He has also shown that certain species moulted flight feathers when I had failed to detect it.

Dr. Dwight, in the course of his investigation, examined some 15,000 specimens while I examined probably 8000, and neither of us found the slightest indication of any change in plumage other than that produced by moult or wear.

Considering now the apparently new points brought forward by Dr. Dwight, which either correct or supplement statements of previous writers, we have first the addition of 11 birds to those which renew the flight feathers at the postjuvenal moult:—*Sturnus vulgaris*, *Passer domesticus*, *Melospiza fasciata*, *Ammodramus maritimus*, *Petrochelidon lunifrons*, *Clivicola riparia*, *Stelgidopteryx serripennis*, *Progne subis*, *Hirundo erythrogastra*, *Vireo noveboracensis*, and *Icteria virens*.

Some of the Swallows require confirmation in the shape of moulting specimens from the tropics, and the apparent prenuptial moult of *Hirundo erythrogastra* is also left for future confirmation. In this connection a specimen recorded by me should be mentioned, which appears to be an adult that has just assumed the winter plumage and which has short outer rectrices, demonstrating that a prenuptial moult of these feathers at least must take place.

With regard to the Song Sparrow Dr. Dwight shows that some individuals moult only part of the primaries at the postjuvenal moult and that the Indigo Bird occasionally does the same thing, thus accounting for some of the curious autumnal specimens of this species that have been taken. A number of birds are shown to have a prenuptial moult every year in which it was previously thought to be suppressed after the first season. In the case of the Pine Finch no mention is made of the prenuptial moult which undoubtedly takes place in the first year.[1]

[1] See Auk, 1897, p. 320.

One of the most interesting points in the paper is the explanation of the brightening of the winter plumage of the Purple Finch, Crossbill, etc., in which the winter feathers are shown to have red barbs and gray barbules. The latter being very largely lost in spring leave only the red elements of the feathers and the whole plumage is thereby brightened. The author likewise claims that all Purple Finches assume the red plumage at the first postnuptial moult, and that none remain always in the brown state, as had been supposed by some. The former idea that some male White-throated Sparrows never attained the brightest coloration of the species is also disproven. On the contrary, there is a regular prenuptial moult, and all old males are dull in winter, the highly plumaged winter specimens being apparently precocious young which have anticipated the prenuptial moult at the postjuvenal.

Mottled breeding Crossbills are shown to be birds of the previous year that have undergone a postjuvenal moult of varying extent in different individuals, and all males at the first prenuptial moult become uniform red, which color is not again lost.

The abrasion of the tips of the feathers in the Snowflake Dr. Dwight regards as due to the more rapid chemical disintegration of the light areas and not to their more delicate nature and looser construction, as stated by Mr. Chapman and the writer.

The case of the Orchard Oriole, the long-standing puzzle in the study of moult, is still unsolved in all its details, but Dr. Dwight advances excellent arguments in support of his theory that the chestnut and black plumage is acquired at the first postnuptial moult, the green mottled birds being all in the first nuptial plumage, the difference being due to individual precocity. In fact Dr. Dwight thinks that every one of our Passerine birds can and in most cases probably does assume the adult plumage at the end of the first nuptial season.

The Flycatchers (except *Myiarchus* and *Sayornis*), like the Swallows, still await more specimens from the tropics before their moults can be understood, owing to the fact that they migrate before the change takes place.

The above are merely some of the most important discoveries made by Dr. Dwight, but his whole paper teems with exact information, original in many of its details, and it should be carefully studied by every one interested in the subject.

The time is about past when a collector was content to call breeding birds 'adults' and all others 'immature.' The fact already outlined is now clearly established that every species has a definite sequence of plumages, each corresponding to a certain period of its life, and through which each individual goes.

By the aid of Dr. Dwight's work it is now possible to tell the exact nature of the plumage of all our specimens, and systematic works of the future must needs adopt the nomenclature of plumages herein set forth if they would be up to date.

The few points left unsettled will, we trust, be cleared up in the near

future. Meantime all ornithologists owe Dr. Dwight a debt of gratitude for one of the most important contributions to recent ornithological literature.— W. S.

Grinnell's 'Birds of the Kotzebue Sound Region.'[1] — This is the first brochure of a new series of publications, the 'Pacific Coast Avifauna,' by the Cooper Ornithological Club of California.

The region with which Mr. Grinnell deals "includes the district coastwise between Cape Prince of Wales and Hope Point, and thence eastward to the headwaters of the streams flowing into Kotzebue Sound," and consists of the "valleys of the Noatak, Kowak, Selawik and Buckland Rivers, as well as several smaller streams, all of which empty into Kotzebue Sound." Mr. Grinnell, in a schooner yacht, reached the vicinity of Cape Blossom July 9, 1898, with a company of prospectors "to explore the Kowak Valley for gold or any other valuable resource this little-known country might afford." They were provided with lumber and machinery for the construction of a stern-wheel steamer for use on the larger streams of the region. While the expedition proved unsuccessful in its search for gold, it afforded Mr. Grinnell excellent opportunity for ornithological work during the year or more spent in this interesting region, the results of which are here detailed.

After describing the character of the country visited, the author gives an extensively annotated list of the birds observed, numbering 113 species, which is followed by a bibliography of Kotzebue Sound ornithology, and a 'Checklist of the Birds of the Kotzebue Sound Region,' numbering 150 species, based on the authorities cited in the bibliography, supplemented by his own observations. A map of the region shows the localities visited.

Mr. Grinnell's paper is thus a most valuable contribution to Alaskan ornithology. His notes on many of the birds met with are quite extended, sometimes occupying several pages, and greatly increase our knowledge of their breeding habits and seasons of arrival and departure, and there are also important technical notes. His accounts of the two species of Ptarmigan, the Willow Ptarmigan and the Rock Ptarmigan, are especially full and interesting, and include valuable notes on the moulting of these species, and the use of the black ocular stripe in the Rock Ptarmigan. He says: "The natives say this black is so the Rock Ptarmigan, which live on the mountains where the snow covers the ground till midsummer, will not be blinded by the intense glare. The natives themselves, in the spring before going out on a days hunt, thoroughly blacken the region around their eyes and across the nose, with soot, to prevent snow-blind-

[1] Birds of the Kotzebue Sound Region, Alaska. By Joseph Grinnell.=Pacific Coast Avifauna No. 1, Cooper Ornithological Club of California, Santa Clara, Cal., Nov. 14, 1900. Roy. 8vo, pp. 1–80, and map.